United States Department of Agriculture

Agricultural Research Service

National Soil Dynamics Lab

Conservation Systems Research

Research Project Report No. 17

October 2002

Contact us:

USDA-ARS-NSDL
411 S. Donahue Dr.
Auburn, AL 36832
334-844-4741 x179

http://msa.ars.usda.gov/al/auburn/nsdl/csr

Conservation Systems

Research

RESEARCH PROJECT DESCRIPTION No. 17

Roller vs. Herbicides: An Alternative Kill Method for Cover Crops

Front-mounted roller

Researchers
D.W. Reeves (Research Agronomist), D.L. Ashford (Agronomist)

The Challenge

Cereal cover crops are beneficial in conservation systems; however, growers must have an effective and cost-efficient method to kill covers prior to planting the cash crop. Mechanical rollers have been used effectively on millions of acres of conservation-tilled land in southern Brazil and Paraguay. In the USA, the roller is used by only a few progressive producers. However, there is intense grower interest in this implement. Rollers, if economical, could be useful alternatives to reduce inputs of herbicides and could aid in stand establishment in conservation systems.

"The roller by itself and the roller/ herbicide combination methods provided significant savings in the cost of cover crop termination."

flowering, the roller in combination with half-label rates of either of the two herbicides was as effective as full-label rates of the herbicides.

The roller provides additional benefits as it lays residue flat on the soil surface, providing maximum soil coverage to prevent soil erosion, decreases soil water losses, provides weed control, and facilitates planting.

Using the roller alone cost $1.51/acre to operate. The roller/herbicide (half-rate) method reduced herbicide cost an average of $7.05/acre when killing a cover crop.

The roller alone and roller/herbicide methods provided a significant savings (up to $10.64/ acre) in the cost of cover crop termination. It is possible to reduce the use of herbicides and still effectively terminate cover crops.

The Experiment

We established a study on two sites in east-central Alabama to evaluate three cereal cover crops (black oat, rye, and wheat) in relation to plant growth stage and kill method. Cover crops were terminated at three growth stages: flag leaf, flowering, and late milk-soft dough using either 1) a roller designed from modified equipment developed by tillage implement manufacturers; 2) paraquat or glyphosate herbicides; or 3) reduced rates of these herbicides in combination with the roller. Biomass of the covers at termination, percentage kill, and weed ratings were taken at each kill date. Soil water available for planting was also determined at each kill date.

Rear-mounted roller with herbicide sprayer

What We Have Learned

The roller effectively killed all three cover crops when used during late reproductive growth (late milking to soft dough stages). At

Related Publications

Ashford, D.L., D.W. Reeves, M.G. Patterson, G.R. Wehtje, and M.S. Miller-Goodman. 2000. Roller vs. Herbicides: An Alternative Kill Method for Cover Crops. pp. 64-69. In P.K. Bollich (ed.) Proceedings of the 23rd Annual Southern Conservation Tillage Conference for Sustainable Agriculture. Monroe, LA. June 19-21.